What is claimed is:

1. An optical module comprising:

an under cladding having a flat shape as a whole;

a first core which has a quadrangular cross section and is placed on said under cladding;

a second core placed on a terminal end portion of said first core; and

an over cladding placed in a region including the terminal end portion of said first core and said second core placed on the terminal end portion of said first core,

wherein said under cladding and said first core placed thereon constitute a first optical waveguide,

said under cladding, the terminal end portion of said first core placed on said under cladding, said second core placed thereon, and said over cladding placed on and around said second core constitute a mode field size conversion portion,

said under cladding, said second core placed on said under cladding, and said over cladding placed on and around said second core constitute a second optical waveguide,

said first core is made of silicon, and

said first and second cores differ in

cross-sectional shape.

2. A module according to claim 1, wherein the terminal end portion is formed from a tapered portion whose cross-sectional area gradually decreases toward a distal end thereof.

3. A module according to claim 1, wherein said over cladding is placed on and around said second core on said under cladding constituting the second optical waveguide and said second core on the terminal end portion constituting the mode field size conversion portion, and on said first core constituting the first optical waveguide.

4. A module according to claim 1, wherein said under cladding is formed on a silicon substrate.

5. A module according to claim 1, wherein said second core is made of a material higher in refractive index than said under cladding and lower in refractive index than silicon of said first core and the terminal end portion.

6. A module according to claim 1, wherein said first core and at least a side portion of the terminal end portion are covered with a silicon oxide film.

7. A module according to claim 6, wherein said second core on the terminal end portion is placed on the silicon oxide film.

8. A module according to claim 1, wherein said second core covers a substantially entire region on an upper surface of the terminal end portion.

9. A module according to claim 1, wherein said under cladding is formed from a silicon oxide film.

10. A module according to claim 1, wherein said under cladding is formed on a substrate.

11. A module according to claim 1, wherein a refractive index of said over cladding is higher than that of said under cladding.

12. A module according to claim 1, wherein a specific refractive index difference between said second core and said under cladding is larger than that between said second core and said over cladding.

13. A module according to claim 3, wherein said over cladding placed on said core of the first optical waveguide is continuous with said second core of the

second optical waveguide, and said over cladding and said second core are made of the same material.

14. A module according to claim 13, wherein a second over cladding is placed on said over cladding placed on said core of the first optical waveguide and said second core of said second optical waveguide continuous with said over cladding, and said second over cladding is lower in refractive index than said second core.

15. A module according to claim 13, further comprising regions where the material for said second core does not exist at two positions symmetrical with respect to a traveling direction of light in said second core.

16. A manufacturing method for an optical module, comprising the steps of:

forming an under cladding;

selectively forming, on said under cladding, a first core which has a wire-like shape with a quadrangular cross section and is made of silicon;

selectively forming a second core on a terminal end portion of the first core and the under cladding continuous with the terminal end portion; and

forming an over cladding on and around the

second core,

wherein the under cladding and a portion of the first core which is placed on the under cladding constitute a first waveguide,

the under cladding, the terminal end portion of the first core placed thereon, and the second core placed on the terminal end portion constitute a mode field size conversion portion,

the under cladding and the second core placed thereon constitute a second waveguide, and

the first and second cores have different cross-sectional shapes.

17. A method according to claim 16, further comprising the step of oxidizing the first core and at least a side surface of the terminal end portion of the first core after the step of forming the first core.

18. A method according to claim 16, wherein the terminal end portion is a tapered portion made of silicon, whose cross-sectional area gradually decreases toward a distal end of the first core.

19. A method according to claim 17, wherein the step of oxidizing the side surface of the terminal end portion comprises the step of oxidizing the side surface after masking the first core and an upper surface of the

terminal end portion of the first core with an anti-oxidation film.

20. A method according to claim 17, wherein the step of oxidizing the first core and the side surface of the terminal end portion of the first core comprises the step of oxidizing to cover the first core and the terminal end portion thereof in addition to the side surface of the terminal end portion.

21. A method according to claim 17, wherein the step of oxidizing the first core and the side surface of the terminal end portion of the first core comprises a thermal oxidation process.

22. A method according to claim 17, wherein the step of oxidizing the terminal end portion comprises the step of oxidizing the first core and a distal end of the terminal end portion by a width dimension not less than 1/2 that before oxidation.

23. A method according to claim 17, wherein

in the step of forming the first core, a silicon layer around the first core is left by a predetermined thickness, and

the step of oxidizing the side surface of the terminal end portion includes a process of converting

the silicon layer having the predetermined thickness and left around the first core into a silicon oxide film.

24. A method according to claim 23, wherein in the step of forming the first core, the silicon layer left around the first core has a thickness not less than 1/2 that of the first core after oxidation.

25. A method according to claim 17, wherein the step of oxidizing the side surface of the terminal end portion of the first core includes the step of increasing a refractive index of a silicon oxide film formed within a range of refractive indices lower than a refractive index of silicon.

26. A method according to claim 17, wherein the step of forming the second core comprises the step of forming the second core extending to the first core through the terminal end portion.

27. A method according to claim 26, further comprising the step of further forming a second over cladding on the over cladding placed on the core of the first optical waveguide and the second core of the second optical waveguide continuous with the first optical waveguide,

the second over cladding having a refractive

index than the second core.

28. A method according to claim 26, further comprising the step of forming regions where the material for the second core does not exist at two positions symmetrical with respect to a traveling direction of light in the second core.